

# How Maps Distort the View of Reality - Mapping the Austrian Presidential Election 2016

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**Abstract:** For the first time in history, the Austrian presidential elections in 2016 had to be repeated due to a successful formal objection of one of the candidates. The small difference (0.7%) of the votes between the two candidates as well as incorrect election procedures instigated the constitutional court to repeat the election. With an electoral participation of more than 70% (4,637,046 votes cast from a total of 6,382,507 possible), 30,863 votes were the decisive factor. In this context, media played an important role in communicating and distributing the election results. Maps and map related forms of representation were utilized to demonstrate the tight outcome of the poll. These representations shaped the political debate and led to a strong polarization within the public political discourse and social media. The visualization of the election outcome turned out to be a cartographic challenge. Due to the uneven population distribution as well as large uninhabitable areas in Austria that cover over 60% of the country the conventional choropleth maps that were used showed a very misleading picture of the actual results. Furthermore, according to the current demographic distribution of Austria, over 60% of the inhabitants live in densely populated urban areas, covering less than 5% of the total nation's surface. Available election data and in many cases also the broad spectrum of census data is not geo-tagged. Therefore data is based on primarily unevenly distributed administrative units. Choropleth maps utilizing this approach have always been a common cartographic method of depicting thematic content and are still one of the most frequently used map types. However, the classic approach of shading the administrative units in proportion to their area leads to significant problems. The visual perception is highly influenced by different geographic areas of the reference units, leading to a visual underrepresentation of small, as well as an overrepresentation of large areas. The usage of cartograms can avoid this circumstance by representing the geographic units in proportion to thematic reference values, such as total population. However, by distorting the geometry, a fundamental cartographic prerequisite for a map – the topographic orientation – is deteriorated. In recent years, the representation of thematic information on the basis of regular arranged units revealed a possibility to bypass the before mentioned shortcomings. This approach enables the visualization on the basis of a regular pattern without the disadvantage of distorting the basic geometry. Although the increasing number of available grid choropleth maps show a growing interest in this visualization approach, there is still a demand on basic methodological exploration. The methodological challenges are broad, covering data issues as well as depiction aspects. In general, data from administrative units has to be derived from populated clusters. The current investigation focuses on resolving representative thematic (populated) clusters within administrative units (one cluster point per unit). Furthermore, the definition of a representative grid-cell size for the total area has to be defined to guarantee a significant balance between populated clusters and grid-cell size. The graphic representation of the data has to consider both the display of a single variable (relative: candidates results), as well as bivariate variables (relative: candidates results, absolute: number of eligible voters). The overall methodological workflow has to guarantee a focused, undisturbed and smooth depiction through evenly distributed grid-cells without distraction. This paper reflects on the assessment of various representation methods with special emphasis on a regular grid structure, derived from populated clusters based on administrative boundaries. It will compare and discuss conventional cartographic methods and finally present an approach to accommodate the above described irregularities to facilitate the depiction of reality with minimal distortion.

**Keywords:** thematic mapping, map design, populated cluster, regular grid mapping